

WHAT IS CLAIMED IS:

1. An image processing device comprising:

input means for inputting an digital image wherein one or more color components are non-existent in each pixel, obtained from a single-sensor image-pickup system, a double-sensor image-pickup system, or a triple-sensor pixel spatial offset image-pickup system;

combination average calculation means for making a combination of two or more pixels from a plurality of pixels having the same color component near the pixel of interest within the image signals input from the input means, and calculating the average for the combination of the color components of two or more pixels for a plurality kinds of combinations of pixels in the region near the pixel of interest;

color correlation estimation means for estimating color correlation which is a correlation between different color components within the region near the pixel of interest; and

combination selection means for selecting one of the plurality of combination averages calculated by the combination average calculation means, as the non-existent color component for the pixel of interest, based upon the color correlation estimated by the color correlation estimation means.

2. The image processing device according to Claim 1, wherein the combination average calculation means further calculates the fluctuation of the color component within the combination of two or more pixels;

and wherein the color correlation estimation means further calculates the reliability of the estimated color correlation;

and wherein, in the event that the reliability calculated by the color correlation estimation means is high, the combination selection means estimates the non-existent color component for the pixel of interest based upon the estimation results of the color correlation and the color component obtained in the pixel of interest, and selects the combination average which is the closest to the estimated non-existent color component candidate as the non-existent color component, and in the event that the reliability is low, the combination selection means selects the combination average corresponding to the combination wherein the fluctuation of the color component calculated by the combination average calculation means is the least, as the non-existent color component.

3. An image processing device comprising:

input means for inputting an digital image wherein one

or more color components are non-existent in each pixel, obtained from a single-sensor image-pickup system, a double-sensor image-pickup system, or a triple-sensor pixel spatial offset image-pickup system;

first non-existent color component generating means for making a combination of two or more pixels from a plurality of pixels having the same color component near the pixel of interest within the image signals input from the input means, calculating the average for the combination the color components of two or more pixels for a plurality kinds of combinations in the region near the pixel of interest, and selecting one of the calculated averages so as to generate the non-existent color component;

second non-existent color component generating means for estimating the color correlation which is a correlation between different kinds of color components near the pixel of interest for each pixel, and generating the non-existent color component based upon the estimated color correlation and the color component obtained in each pixel;

evaluation means for evaluating the reliability of the color correlation estimated by the second non-existent color component estimation means; and

third non-existent color component generating means for setting the weight as to the non-existent color component generated by the second non-existent color component

generating means based upon the reliability evaluated by the evaluation means, and calculating the weighted average for the non-existent color component generated by the first non-existent color generating means and the non-existent color component generated by the second non-existent color component generating means using the set weight, thereby generating the non-existent color component value.

4. The image processing device according to Claim 3, further comprising region judgment means for making judgment whether or not the region near the pixel of interest is a texture region, and also making judgment whether or not the region near the pixel of interest is an edge region, wherein in the event that judgment is made by the region judgment means that the region is a texture region, the evaluation of the reliability is increased, and conversely in the event that judgment is made that the region is an edge region, the evaluation of the reliability is decreased.

5. An image processing program for inputting an digital image wherein one or more color components are non-existent in each pixel, obtained from a single-sensor image-pickup system, a double-sensor image-pickup system, or a triple-sensor pixel spatial offset image-pickup system, estimating the non-existent color component for each pixel

so as to output a color digital image, the program comprising:

step for combination average calculation processing for making a combination of two or more pixels from a plurality of pixels having the same color component near the pixel of interest, and calculating the average for the combination of the color components of two or more pixels for a plurality kinds of combinations of pixels in the region near the pixel of interest;

step for color correlation estimation processing for estimating color correlation which is a correlation between different color components within the region near the pixel of interest; and

step for combination selection processing for selecting one of the plurality of combination averages calculated by the combination average calculation processing, as the non-existent color component for the pixel of interest, based upon the color correlation estimated by the color correlation estimation processing.

6. The image processing program according to Claim 5, wherein the combination average calculation processing further includes processing for calculating the fluctuation of the color component within the combination of two or more pixels;

and wherein the color correlation estimation processing further includes for calculating the reliability of the estimated color correlation;

and wherein in the event that the reliability calculated by the color correlation estimation processing is high, the combination selection processing estimates the non-existent color component candidate for the pixel of interest based upon the estimation results of the color correlation and the color component obtained in the pixel of interest, and selects the combination average which is the closest to the estimated non-existent color component candidate as the non-existent color component, and in the event that the reliability is low, the combination selection processing selects the combination average corresponding to the combination wherein the fluctuation of the color component calculated by the combination average calculation processing is the least, as the non-existent color component.

7. An image processing program for inputting an digital image wherein one or more color components are non-existent in each pixel, obtained from a single-sensor image-pickup system, a double-sensor image-pickup system, or a triple-sensor pixel spatial offset image-pickup system, estimating the non-existent color component for each pixel so as to output a color digital image comprising:

step for first non-existent color component generating processing for making a combination of two or more pixels from a plurality of pixels having the same color component near the pixel of interest, calculating the average for the combination of the color component values of two or more pixels for a plurality kinds of combinations of pixels in the region near the pixel of interest, and selecting one of the calculated averages so as to generate the non-existent color component;

step for second non-existent color component generating processing for estimating the color correlation which is a correlation between different kinds of color components near the pixel of interest for each pixel, and generating the non-existent color component based upon the estimated color correlation and the color component obtained in each pixel;

step for evaluation processing for evaluating the reliability of the color correlation estimated by the second non-existent color component estimation processing; and

step for third non-existent color component generating processing for setting the weight as to the non-existent color component generated by the second non-existent color component generating processing based upon the reliability evaluated by the evaluation processing, and calculating the weighted average for the non-existent color component generated by the first non-existent color generating

processing and the non-existent color component generated by the second non-existent color component generating processing using the set weight, thereby generating the non-existent color component value.

8. The image processing program according to Claim 7, further comprising region judgment processing for making judgment whether or not the region near the pixel of interest is a texture region, and also making judgment whether or not the region near the pixel of interest is an edge region, wherein in the event that judgment made by the region judgment processing is that the region is a texture region, the evaluation of the reliability is increased, and conversely in the event that judgment is made that the region is an edge region, the evaluation of the reliability is decreased.